

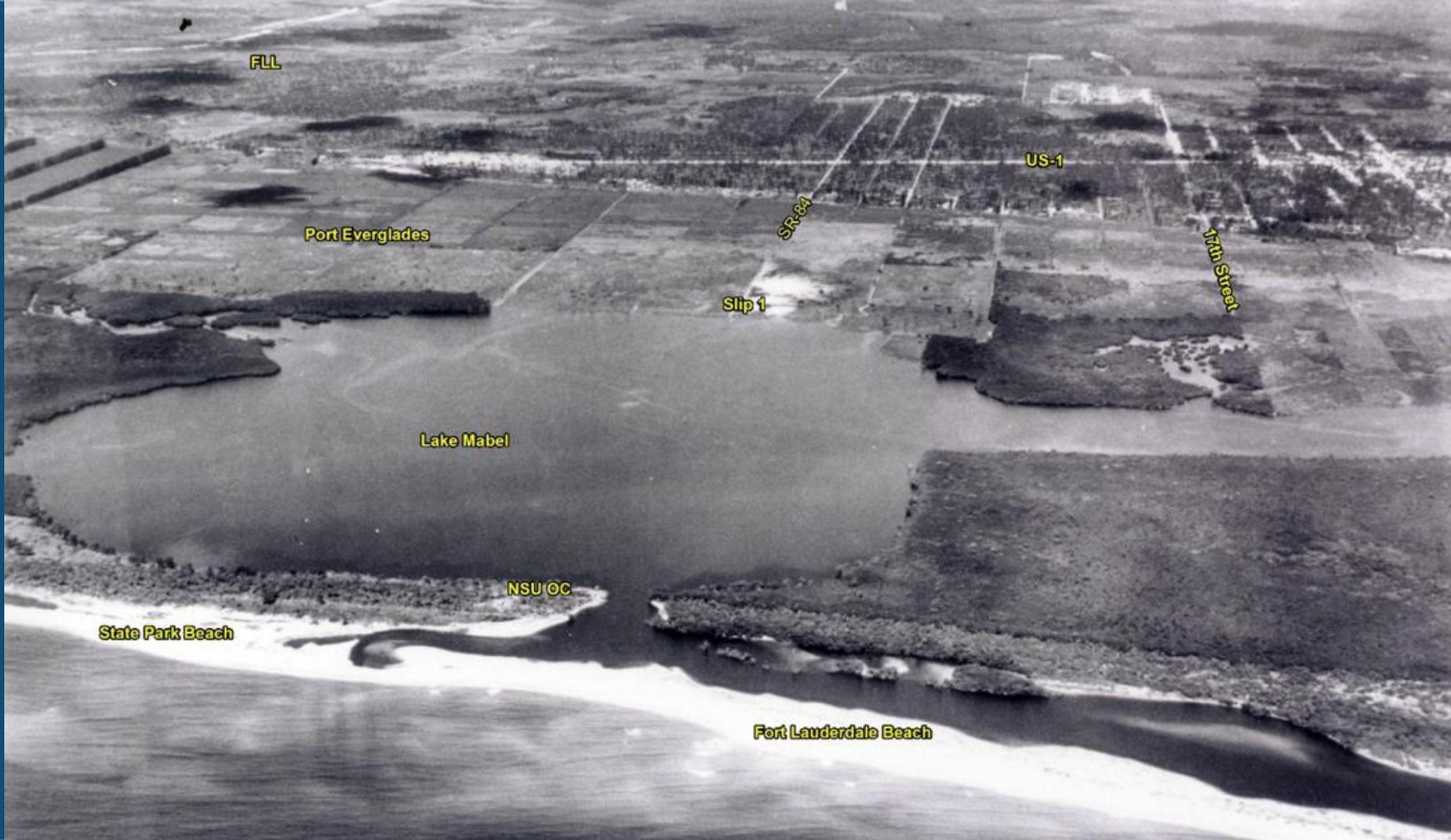
Critical Infrastructure Resilience at Port Everglades

Hydrographic Services Review Panel
Coastal and Maritime Community
Resilience Session

April 4, 2018

David Anderton, AICP, PPM
Assistant Director







Officially Opened **1928**

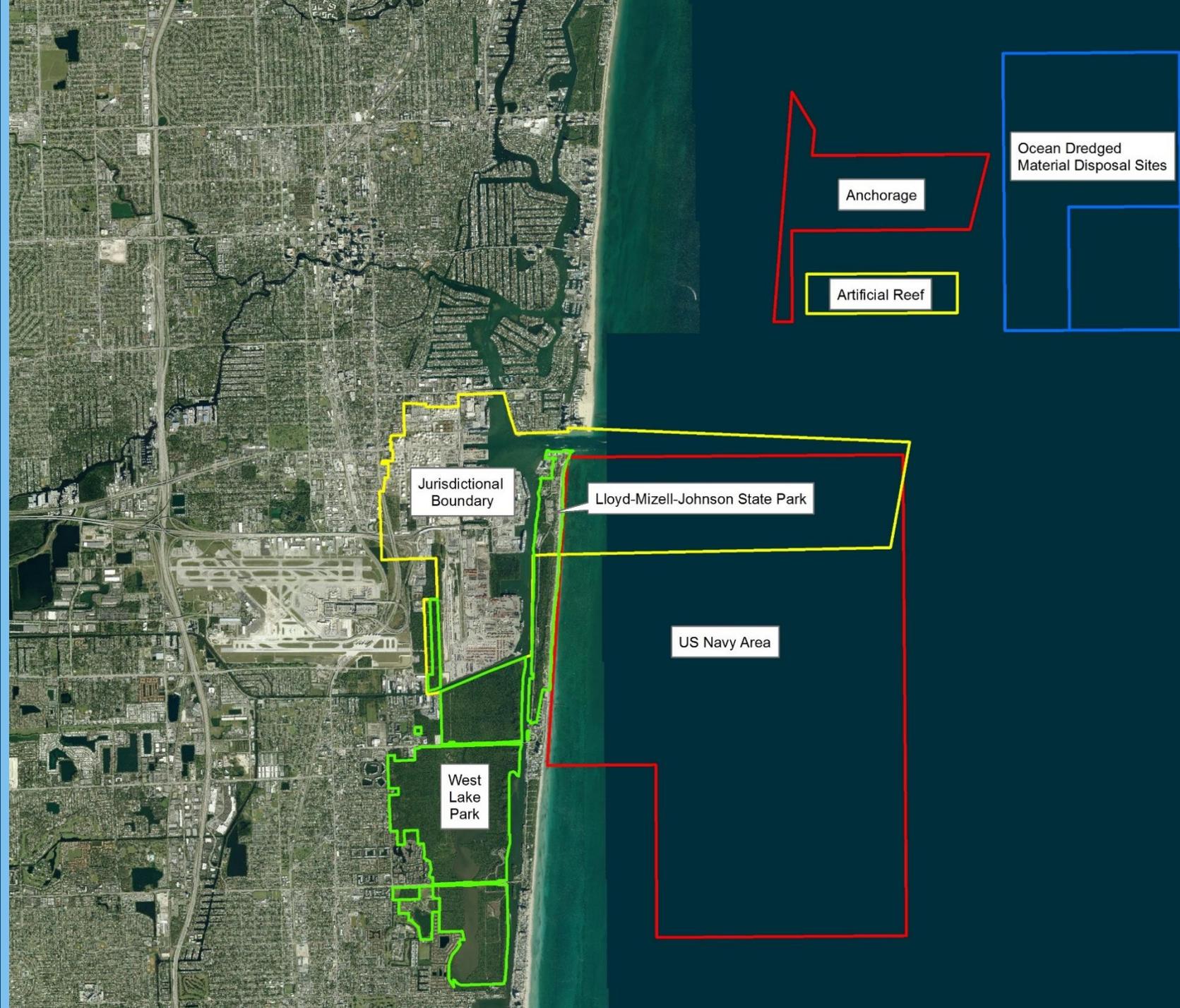


Powerhouse for **Cruise & Cargo**

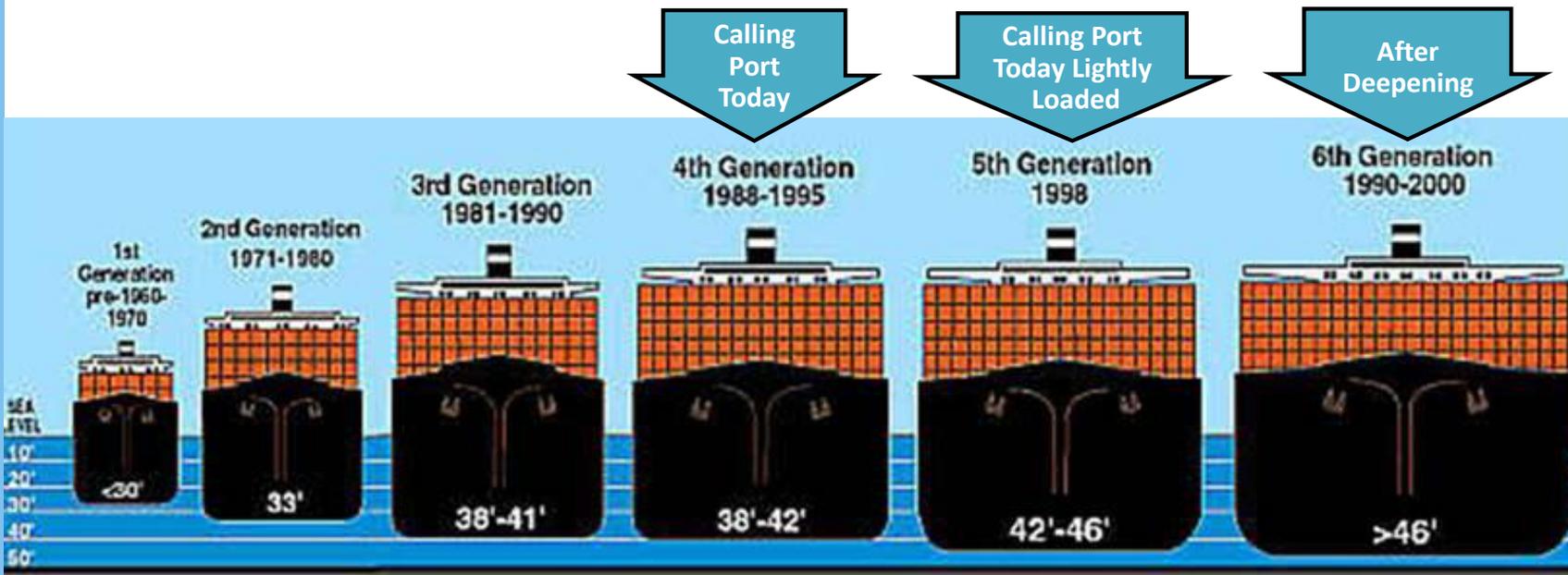
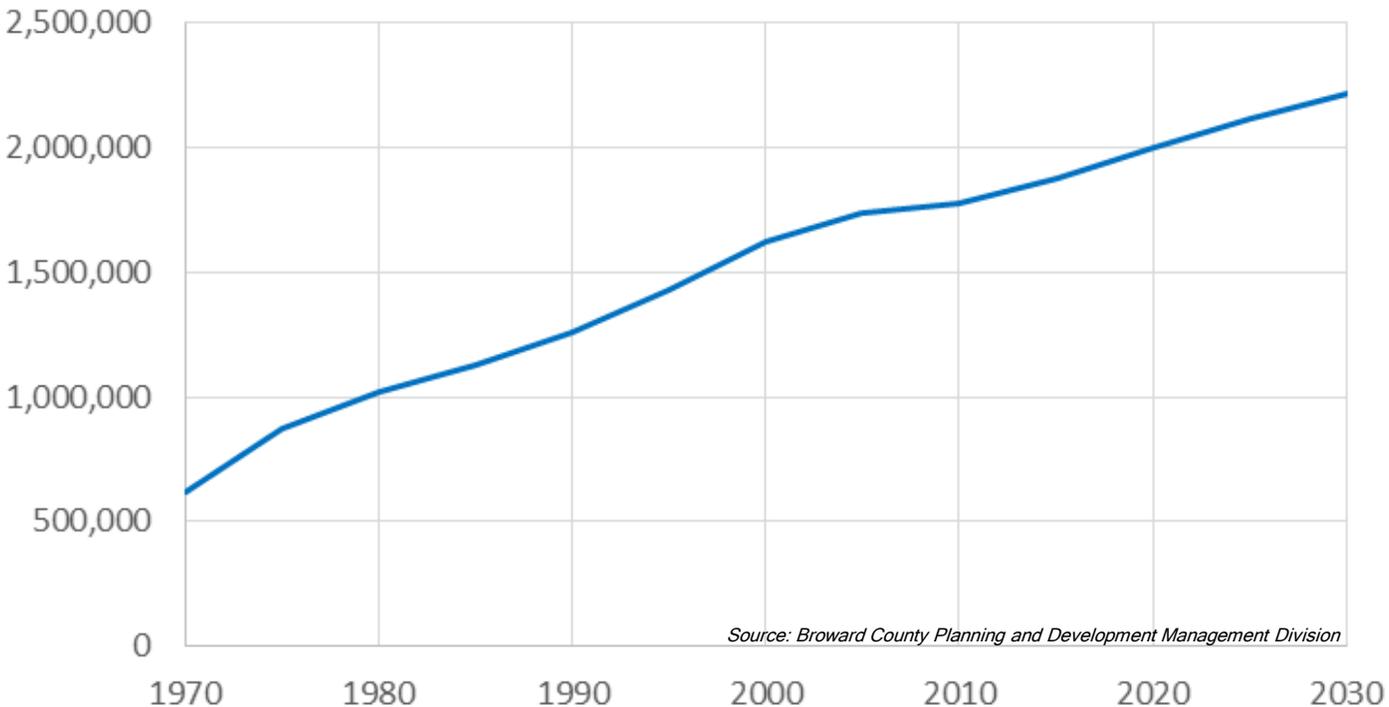
- # 1 Container Port in Florida, #10 in U.S.
- #3 Cruise Port in the World
- #2 Petroleum Port in Florida

Area Boundaries

- Port Everglades
- Artificial Reef
- Anchorage
- ODMDS
- US Navy Area
- Lloyd-Mizell-Johnson State Park
- West Lake Park

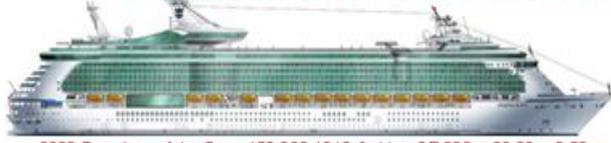


Population Growth And Cargo Vessel Growth





2009 Oasis of the Seas 220 000 2712 Cabins GT 360 × 47 × 9,1



2006 Freedom of the Seas 158 000 1816 Cabins GT 339 × 38,60 × 8,50 m



1999 Voyager of the Seas 137 300 GT 1557 Cabins 311,12 × 38,60 × 8,60 m



1996 Grandeur of the Seas 74 000 GT 975 Cabins 279,8 × 32,20 × 7,60 m



1990 Fantasy 70 400 GT 1028 Cabins 260,8 × 31,50 × 7,80 m



1982 Song of America 37 600 GT 707 Cabins 214,51 × 28,41 × 6,80 m



1970 Song of Norway 18 400 GT 377 Cabins 168,32 × 23,96 × 6,70 m



Harmony of the Seas

Currently the largest passenger ship in the world
226,963 GT / 6,780 passengers at maximum capacity

#1 Florida Petroleum Storage Port

- Since 1930s
- 5.1 Billion Gallons Annually
- FLL and MIA Pipelines
- Former Crude Pipeline
- Serve 12 Counties
- Daily Throughput 14 Million Gallons



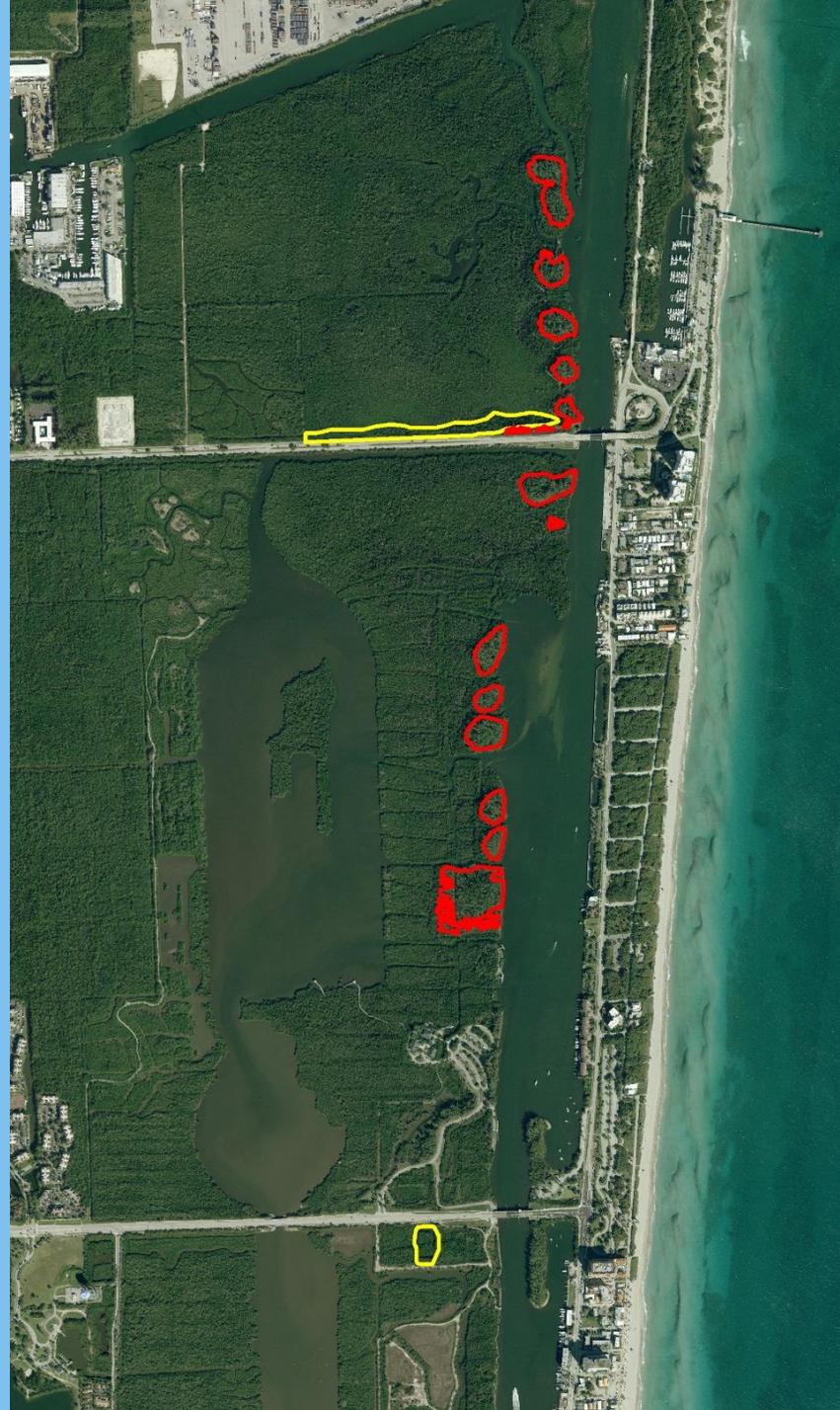
Midport Upland Enhancement Project

- Southport Turning Notch Extension Project
- 16.5-Acre Wetland Enhancement Replaced 8.7-Acres in Conservation
- Planted 70,000 Mangroves
- “Trending for Success”
- IHS Maritime and Trade Magazine’s “Dredging and Port Construction Innovation Award”
- Broward County’s “GoGreen Seal of Sustainability”



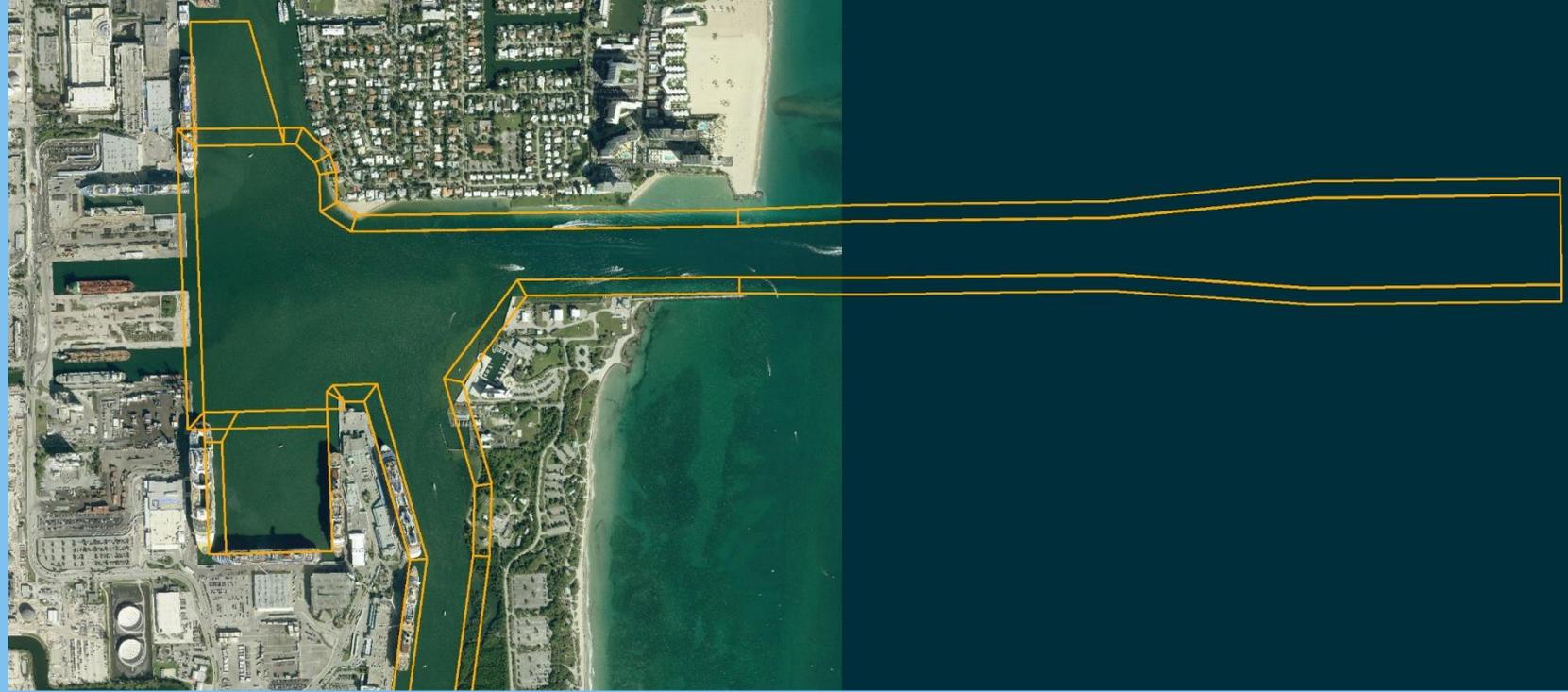
West Lake Natural Area Restoration

- Broward County Park
- USACE Navigation Improvements Project
- Joint-Project with FLL Runway Extension
- 168 Acres of Flushing, Mangrove and Seagrass Mitigation
- Purchase Wetland Parcels
- More Improvements Scheduled (Segment 4)



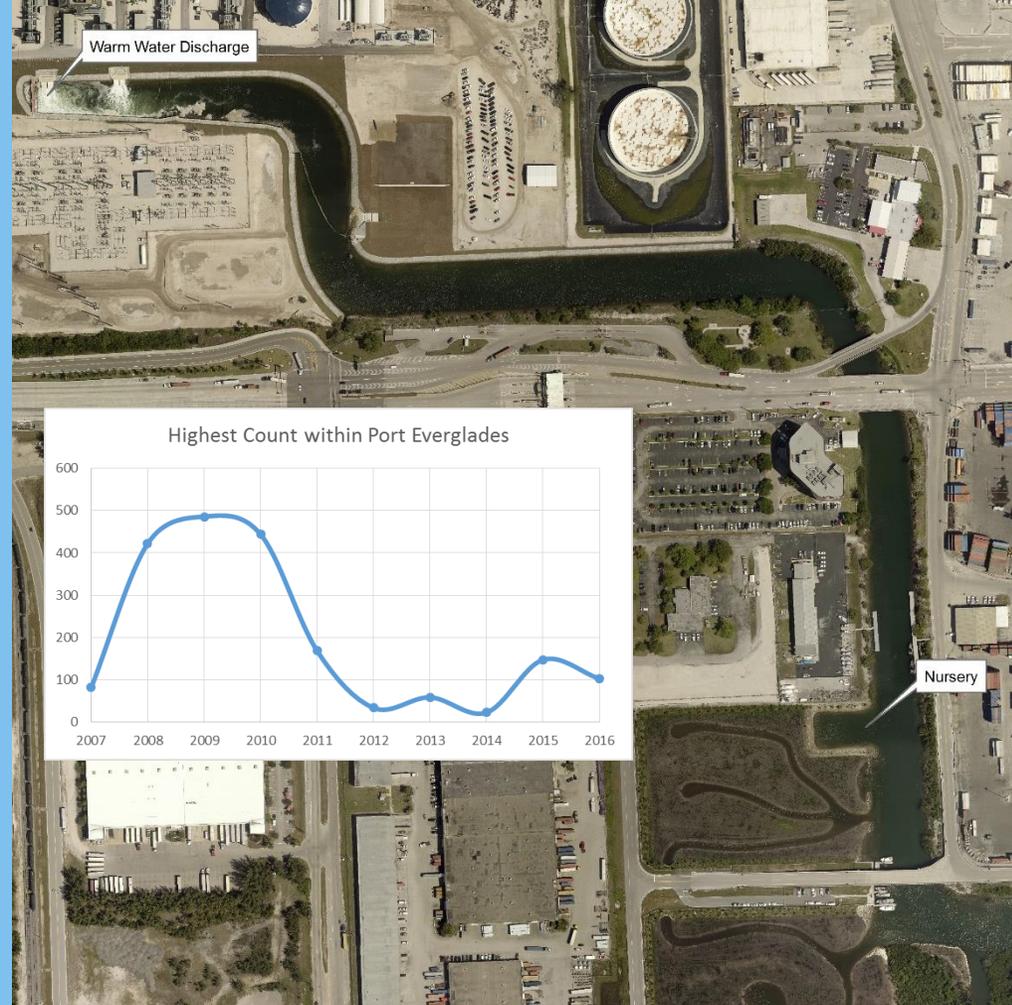
Coral Reef Restoration

- USACE Navigation Improvements Project
- 103,000 new nursery-raised corals will be outplanted on 18 acres of existing reef
- Relocation existing corals in the project area to another 5 acres of existing reef



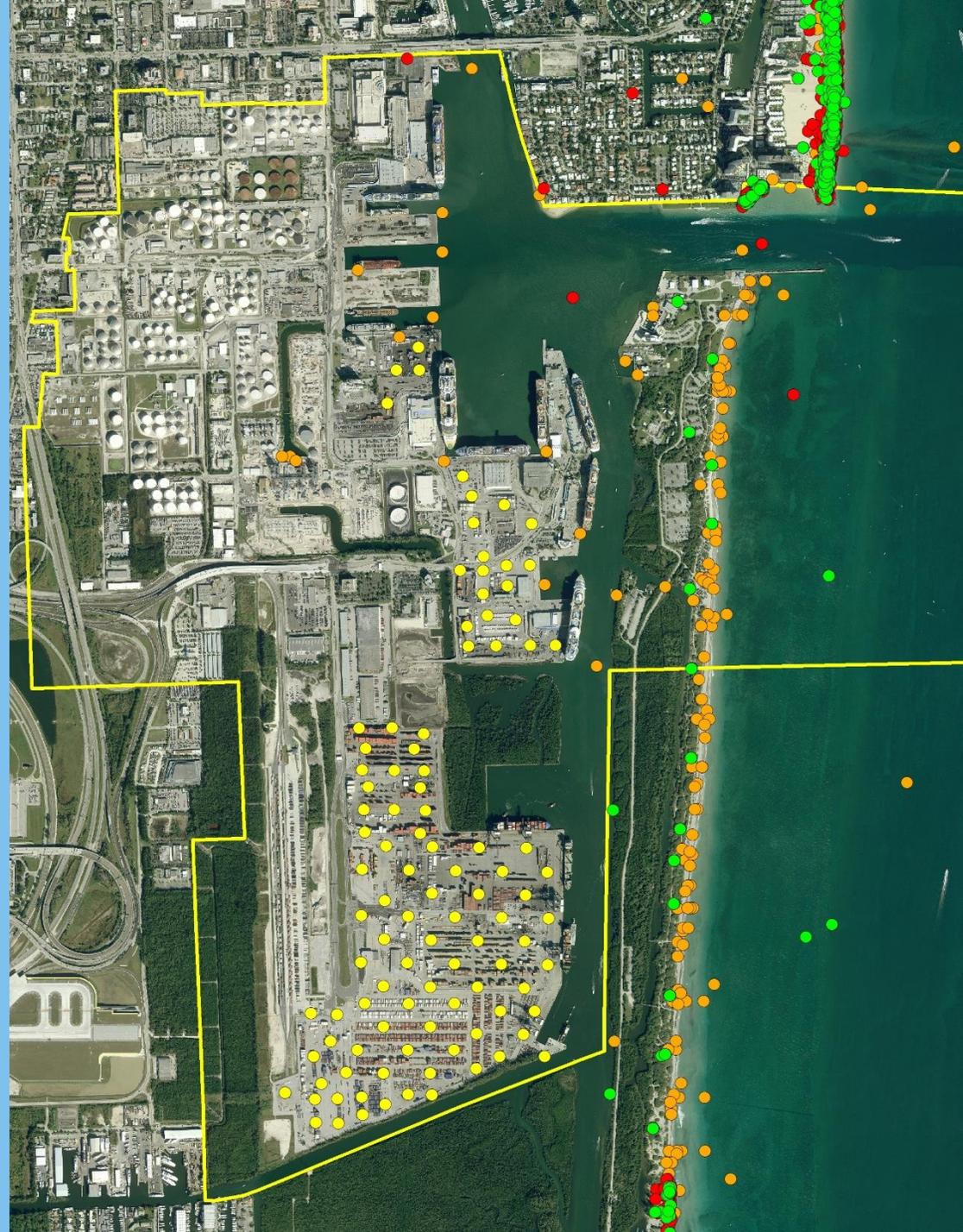
Manatees Aggregation Area

- 2nd Largest in Broward
- FPL Cooling Canal
- 455 Manatees in 2010
- Year-Round Presence
- Manatee Protection Plan and Tariff Requirements
- 4' Manatee Fenders on 26,000' of Bulkhead
- Manatee Exclusion Devices on Stormwater Outfalls
- Enhanced "Nursery Area"



Sea Turtle Nesting and Stranding

- Nesting Beach ¼-Mile
- Critical Loggerhead Breeding Habitat Offshore
- Occasionally Enter Port
- FWC Stranding Response
- Shields on Garage Lights
- High Mast “Turtle-Friendly” LED Lighting Evaluation
- Evaluating Tree Screening, False Crawls and Hatchling Disorientation

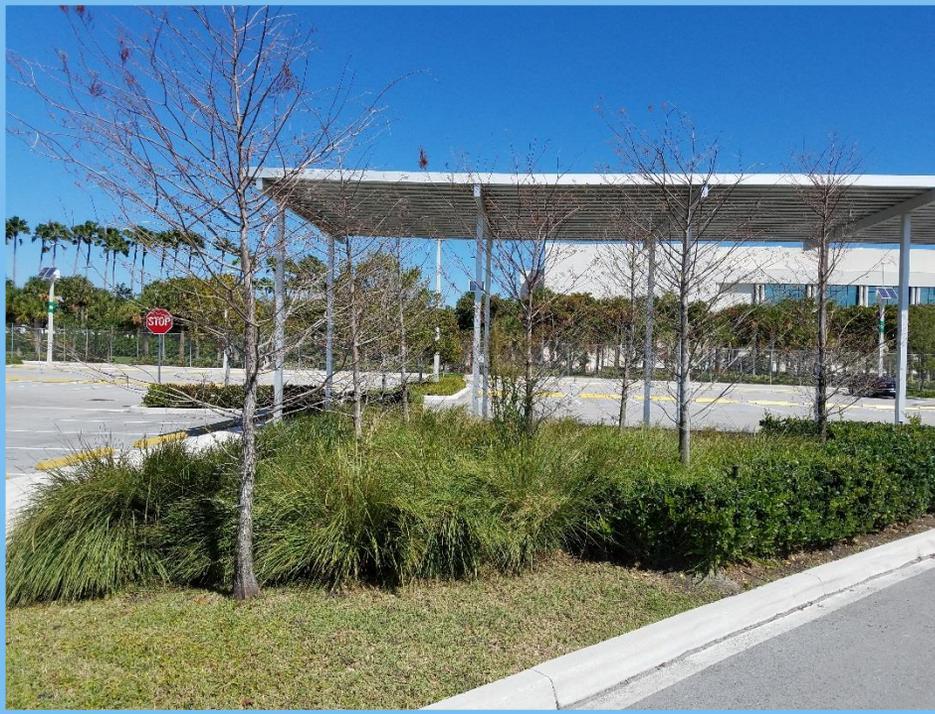


Legend

- High Mast Lights
- Sea Turtle Nests
- Sea Turtle Strandings
- Sea Turtle False Crawls

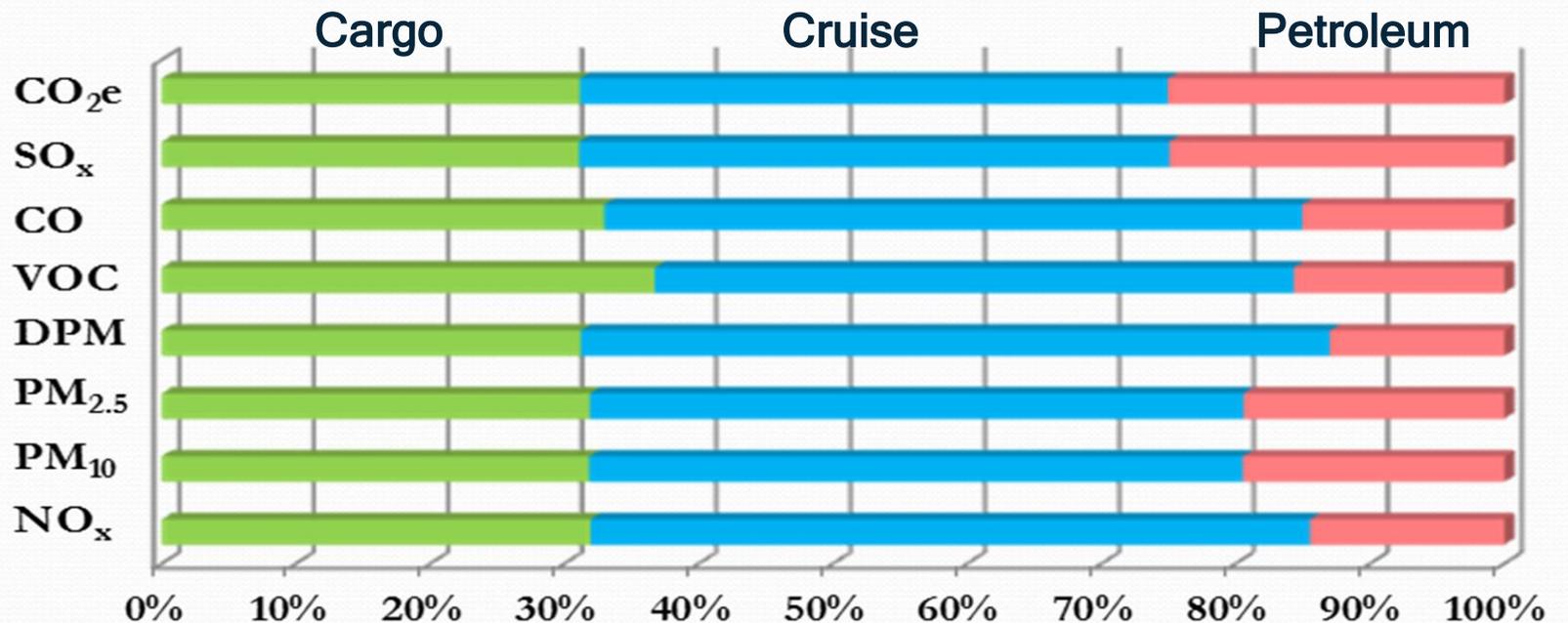
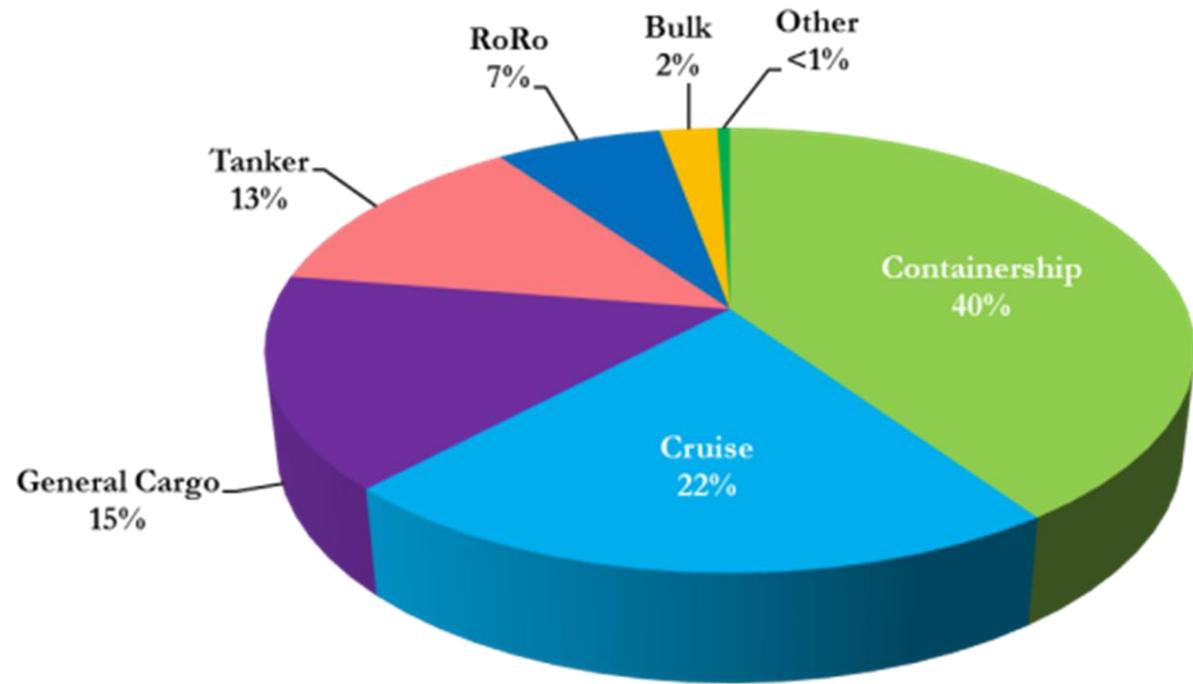
Upland Habitat Restoration

- Certified Wildlife Habitat
- Native Landscaping
- Removing Florida Exotic Pest Plant Council Categories I-II Plants
- Planting Native Broward County Species for Replacement Landscaping



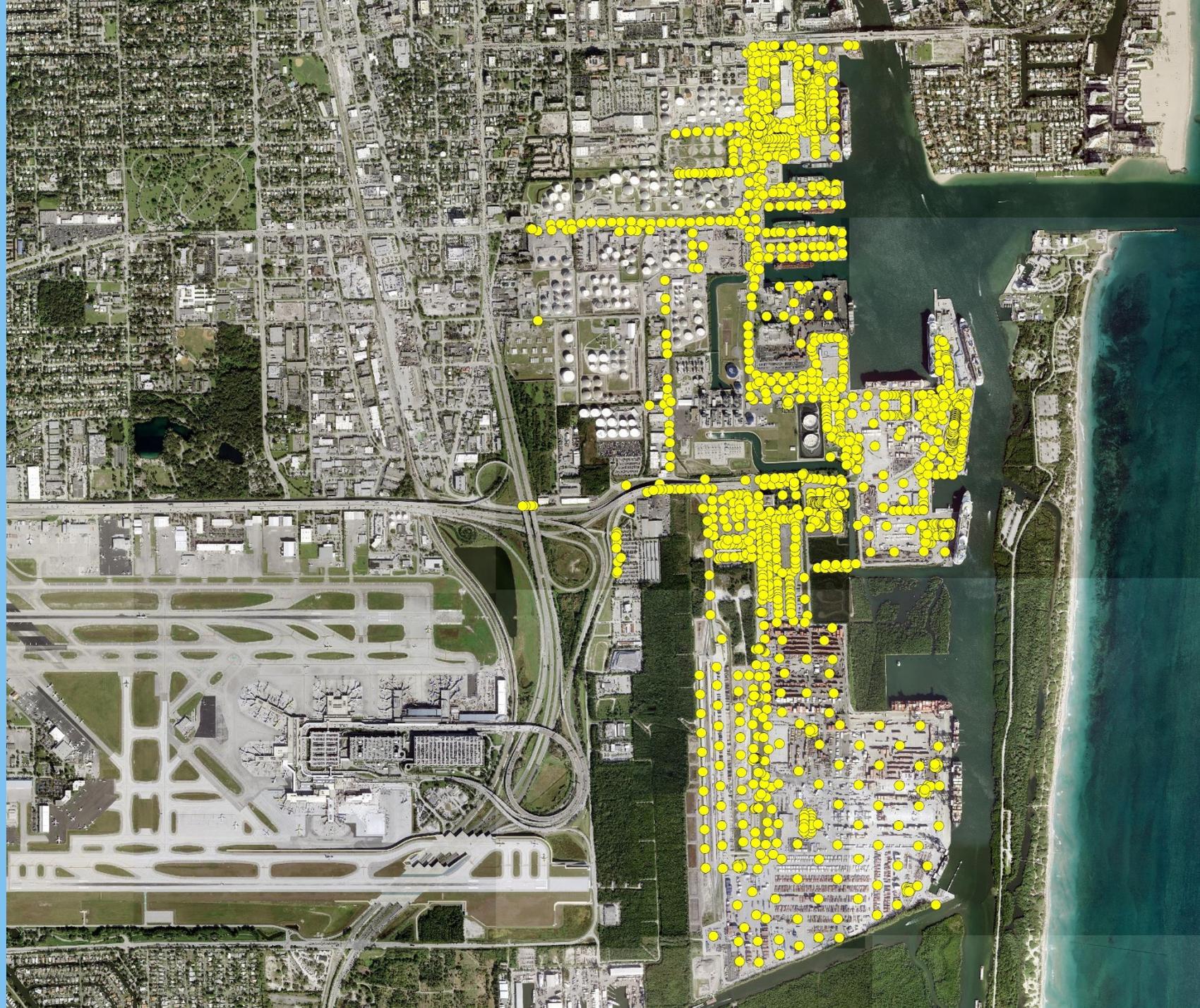
Air Emissions Baseline Inventory

- First Seaport to Voluntarily Partner with EPA
- Categories
 - Ocean Going Vessels
 - Harbor Craft
 - Cargo Handling Equipment
 - Onroad Vehicles
 - Locomotives
- Will be used for air quality restoration



Exterior Lighting Inventory & Master Plan

- Energy Costs
- Offsite Emissions
- NHS, OSHA, FAA and FDOT Requirements
- New Lighting Ordinance
- Impacts to Sea Turtle Nesting Beaches



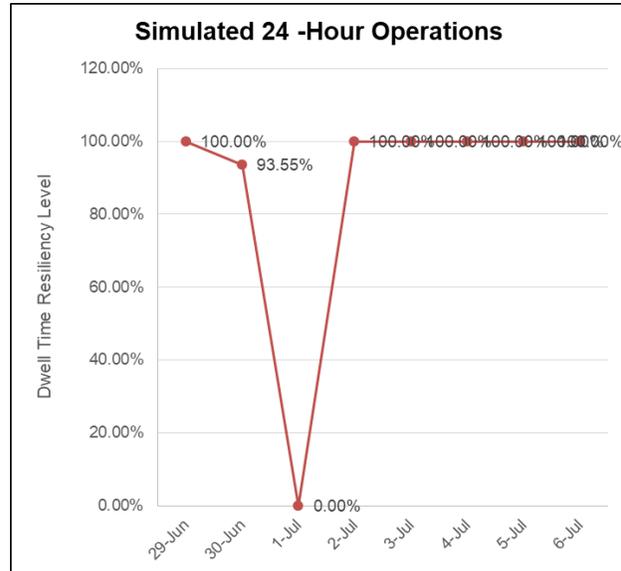
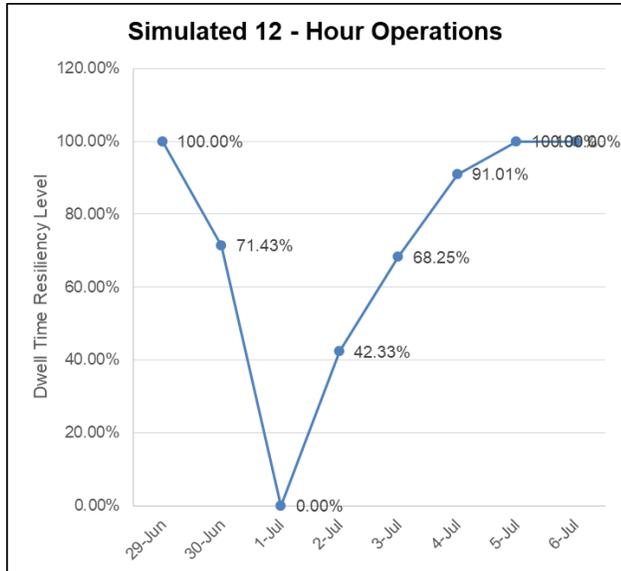
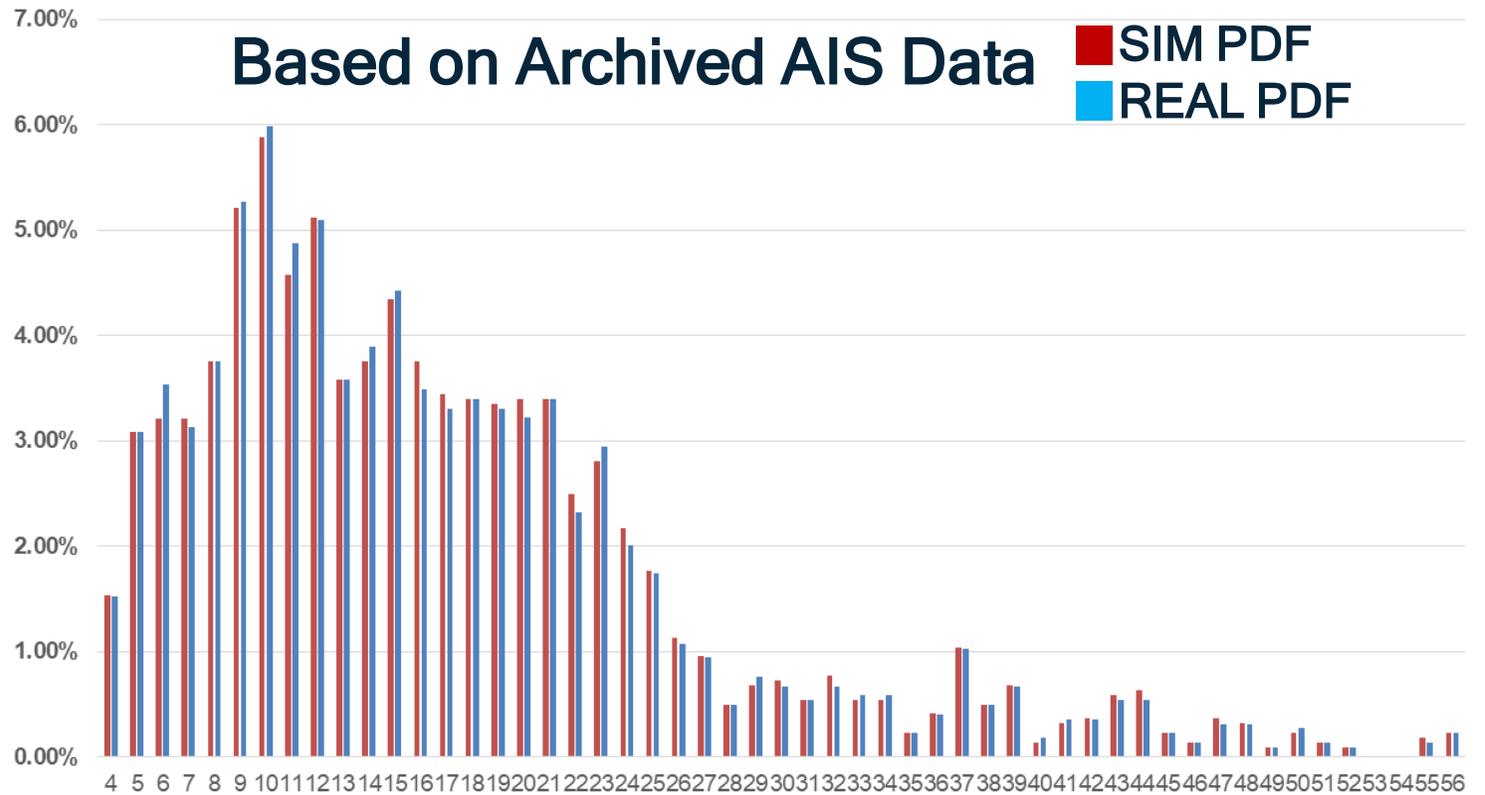
Sustainable Facilities

- \$4.4 Million Energy-Efficient Building Upgrades
- USGBC LEED Certifications
- Broward County's "GoGreen Seal of Sustainability"
- "Green Supply Chain" Award
- "Green Marine" Certification
- Vehicle and Boat Engine Energy-Efficient Retrofits
- Florida Recycling Partnership 75% Recycling Goal
- Climate Change Programs



Florida Atlantic University

- Freight Mobility Research Institute
- Department of Homeland Security
- Studied Assessment and Planning for Resiliency of Ports
- Modeled Storm Surge/Flooding on the East Coast of Florida



Assessment & Measurement of Port Disruptions

“Following a disruption of port operations, what are the secondary and tertiary effects of the port disruption on other modes of transport (trucking, rail, pipeline, etc.) and what are the economic impacts of such an incident?”

- Model baseline operations at Port Everglades
- Develop cyber-physical disruptions catalog
- Simulate the effect of cascading disruptions



CIRI

Critical Infrastructure Resilience Institute

EVERGLADES PORT KEEPER

TEST FOR DISRUPTIONS

Schedule See All

Princess Cruise III 10/07/2017 04:00 Multi day cruise

Spirit of Lisbon 12/07/2017 04:00 Containers

Independence of the seas 12/07/2017 04:00 Ethanol

Cameras See All

MARSEC LEVEL 2

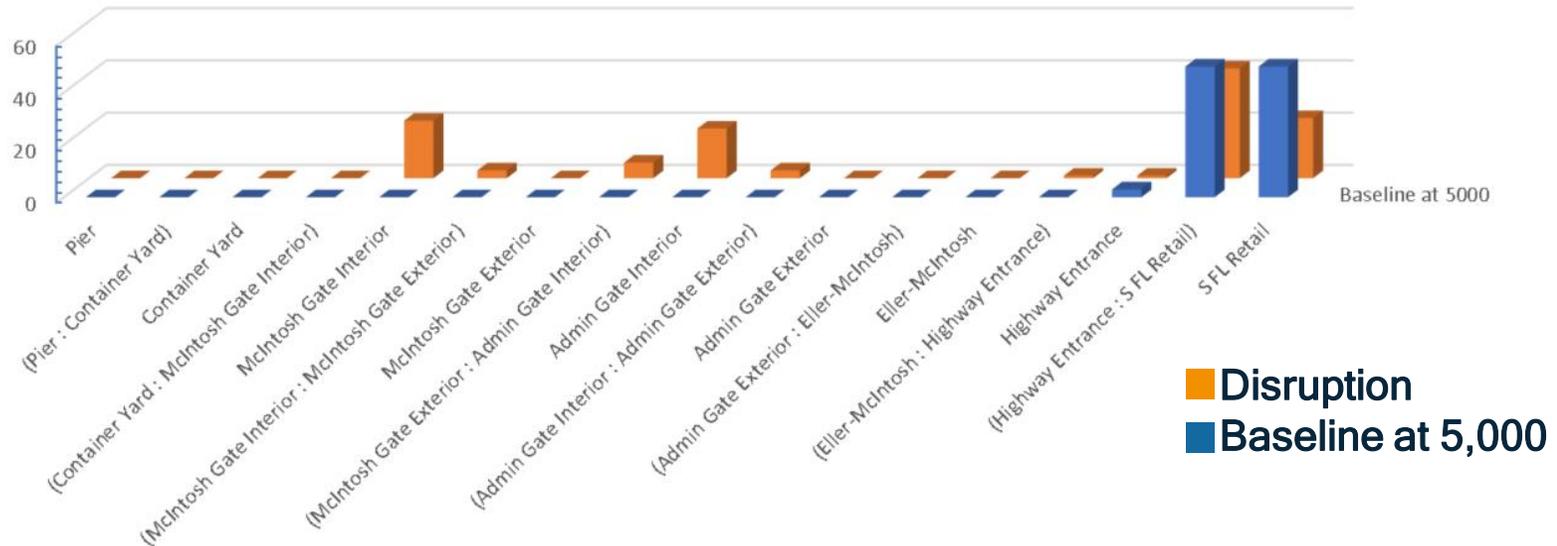
CONDITION OF THE PORT WHISKEY

DISRUPTION DURATION 36 HOURS

Container Yard – TOS Disrupt

3

Container Locations



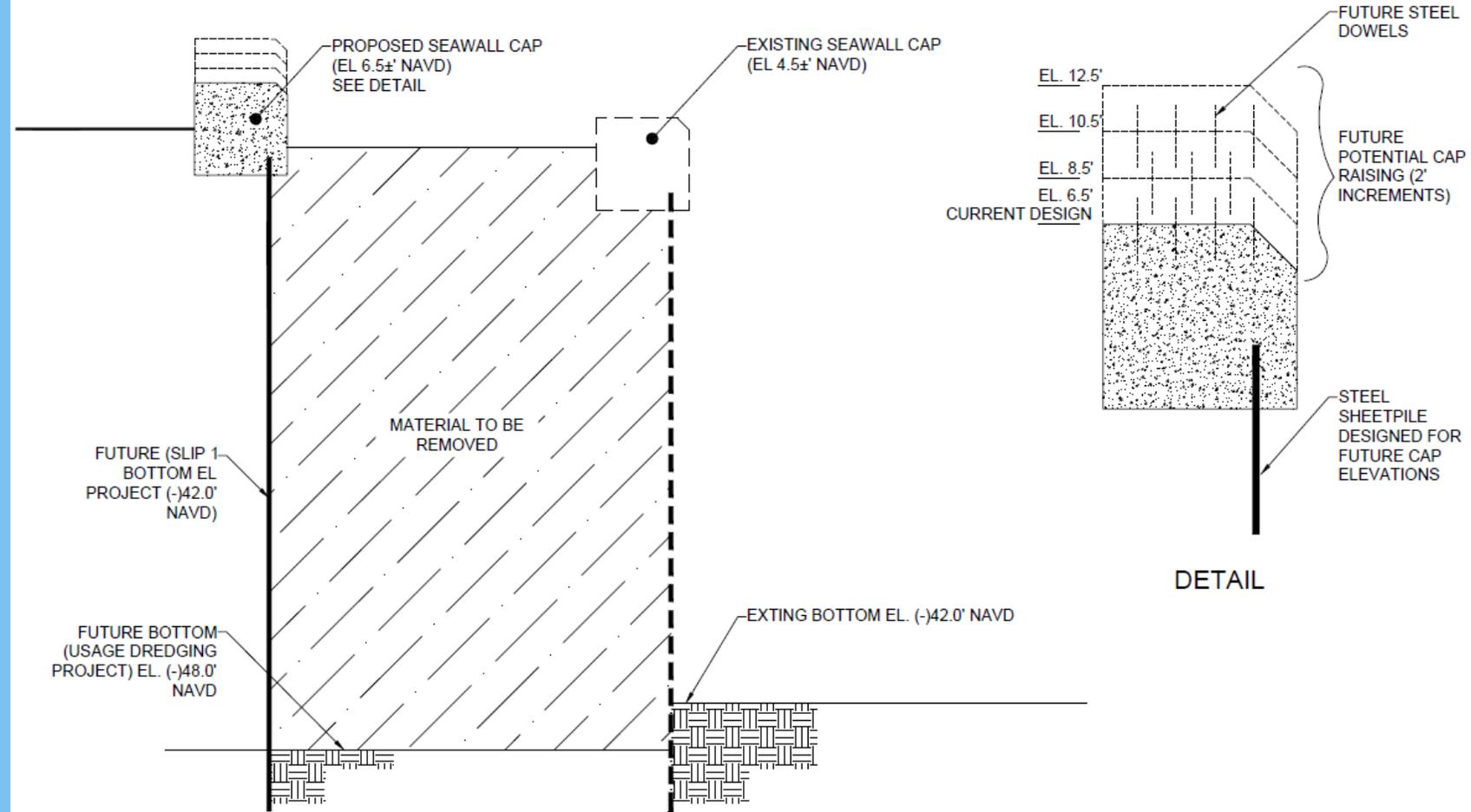
Internal Assessments

- LiDAR Data
 - Fort Lauderdale
 - FDOT due in April
- Security Network Junction Box Survey
- Building Base Floor Elevation Survey



Infrastructure Design Adaptations

- Slip 1 Modifications



SIMPLIFIED FUTURE SEAWALL CAP RAISING DETAIL (SLIP 1 EXPANSION PROJECT)

Hurricane Irma Response

- Fuel Reserves
- Physical Damage
- Vegetation Loss
- Port Reopening
- Ocean Turbidity



Environmental Restoration Collaboration

- Interagency Working Groups
- American Association of Port Authorities Environment Committee
- Florida Ports Council Environmental Committee
- Green Marine/GreenTech 2017
- Southeast Florida Coral Reef Initiative
- Southeast Florida Regional Climate Change Compact
- Broward County Sustainability Stewards
- Broward County Critical Infrastructure and Future Flood Risk Workgroup
- Florida Shorebird Alliance
- South Florida Audubon Society
- FAEP/SFAEP



David Anderton, AICP, PPM
Assistant Director
danderton@broward.org
954-468-0144

Website

porteverglades.net

eMail

PortEverglades@broward.org



@Port.Everglades



@PortEverglades



@PortEvergladesFL



@port-everglades

Stay Connected With Port Everglades